

REMARKS

The Examiner rejects Claims 1-7 under 35 U.S.C. Section 103(a) as being unpatentable over Wan (U.S. 5,354,359) in view of Elmore (U.S. 4,721,526).

Applicant disagrees.

The cited references fail to teach or suggest at least the following italicized limitations in independent Claim 1 and newly added independent Claim 60:

1. A process for recovering a precious metal from a precious metal-containing material, comprising:
(a) providing a heap of the precious metal-containing material; and
(b) passing a thiosulfate lixiviant *and molecular oxygen* through the heap to form a pregnant leach solution comprising dissolved precious metals, *wherein the molecular oxygen is at a pressure greater than its ambient atmospheric pressure before introduction into the heap, wherein the thiosulfate lixiviant has a pH of less than 9 before introduction to the heap.*

60. A process for recovering a precious metal from a precious metal-containing material, comprising:
(a) providing a heap of the precious metal-containing material; and
(b) passing a thiosulfate lixiviant *and molecular oxygen* through the heap to form a pregnant leach solution comprising dissolved precious metals, *wherein the molecular oxygen is at a pressure greater than its ambient atmospheric pressure before introduction into the heap, wherein the thiosulfate lixiviant has a free ammonia content of no more than about 2,000 ppm.*

Wan, et al.

Wan, et al., is directed to thiosulfate leaching at a pH *greater* than pH 9.0 and using an ammonium thiosulfate or sodium thiosulfate lixiviant of at least about 0.05 M, an oxidizing agent, such as cupric tetrammine, at a concentration of less than 0.001 M, *and a free ammonia concentration of at least about 0.05 M*. Although Wan, et al., teaches heap leaching, they say nothing about forcibly aerating the heap during leaching. This is likely due to the substantial ammonia vapor that will be evolved and discharged into the environment by forcible aeration. As will be appreciated, ammonia gas is an environmentally controlled substance.

Elmore, et al.

Elmore, et al., are directed to a method and system for the percolation leaching of gold and silver ores applies a *cyanide* leaching liquid to a pile of gold and silver ore. Heap leaching, vat leaching, or the like may specifically be practiced. The cyanide leaching liquid is applied to the pile by spraying, flooding, or via a foam of oxygen gas and cyanide liquid on top of the pile. Gold and silver are recovered from the pregnant liquor. The leach rate is increased and/or the recovery of gold and silver from the ore is increased by supplying to the pile a gas containing oxygen at a significantly higher percentage than in ambient air (e.g. pure oxygen gas). The oxygen gas may be supplied to the leaching liquid, and/or into the pile itself (as with a plurality of perforated pipes adjacent the bottom of the pile).

It is not obvious to modify the process of Wan, et al., with the teachings of Elmore, et al., to realize the subject invention. As noted, forcible aeration of the heap of Wan, et al., with a molecular oxygen-containing gas at a pH of pH 9 or higher would likely cause the release of harmful levels of free ammonia gas into the environment. Wan, et al., teaches that the presence of ammonia is important to stabilize the thiosulfate complex and the cupric tetrammine. The ammonia is required to be present in an amount of at least about 0.05 M. Because Elmore, et al., use a cyanide lixiviant forcible aeration is environmentally acceptable. No ammonia is present in the cyanide lixiviant.

In contrast, performing the heap leach is performed at a pH less than pH 9 (Claim 1) or using a thiosulfate lixiviant that is substantially free of dissolved ammonia (Claim 60) would maintain, at acceptable levels, the evolution of ammonia vapor during heap aeration and discharge of ammonia gas into the environment.

The dependent claims provide further reasons for allowability.

Based on the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

SHERIDAN ROSS P.C.

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By: 

Douglas W. Swartz

Reg. No. 37,739

1560 Broadway, Suite 1200

Denver, Colorado 80202

Telephone: 303-863-9700

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